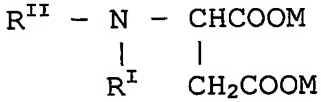
CLAIMS

1. A froth flotation process for the enrichment of a calcium phosphate-containing mineral from an ore also containing calcium carbonate, **characterized in that** the process is performed in the presence, as a collector, of a derivative of aspartic acid of the formula

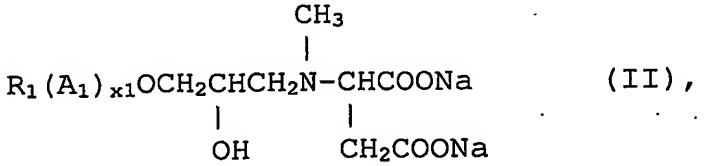


(I),

where R^I is a hydrophobic group containing a hydrocarbon group of 6-24 carbon atoms; R^{II} is an alkyl group with 1-7 carbon atoms or a group of the formula $(B)_yH$, in which B is an alkyleneoxy group with 2-4 carbon atoms and y is a number from 1 to 10; and M is a group selected from the group consisting of a cation or hydrogen.

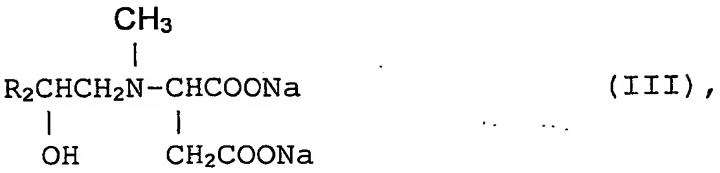
2. A froth flotation process in accordance with claim 1, **characterized in that** R^I is a glycidyl ether group of the formula $CH_2CH(OH)CH_2O(A_1)_{x1}R_1$, in which R_1 is a hydrocarbon group with 8-24 carbon atoms, A_1 is an alkyleneoxy group with 2-4 carbon atoms and x1 is a number from 0 to 10; a hydroxyl group of the formula $CH_2CH(OH)R_2$, in which R_2 is a hydrocarbon group with 6-22 carbon atoms; a propylene ether group of the formula $C_3H_6O(A_3)_{x3}R_3$, in which R_3 is a hydrocarbon group with 8-24 carbon atoms, A_3 is an alkyleneoxy group with 2-4 carbon atoms and x3 is a number from 0-10; or a group of the formula R_4, where R_4 is a hydrocarbon group containing 8-24 carbon atoms.

3. A froth flotation process according to claim 2, **characterized in that** the derivative is selected from the group consisting of



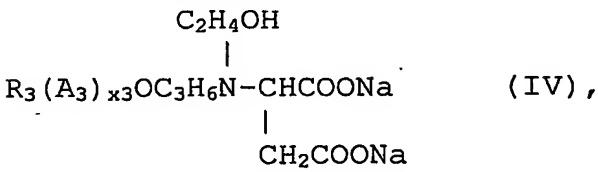
(II),

where R_1, A_1, x1 have the same meanings as in claim 2,



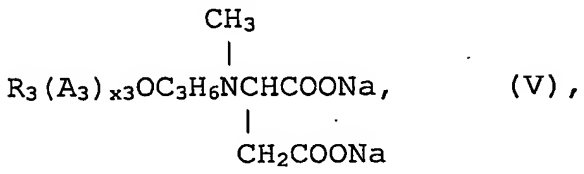
(III),

where R_2 has the same meaning as in claim 2,



(IV),

where R_3, A_3 and x3 have the same meanings as in claim 2, and



(V),

where R_3, A_3 and x3 have the same meanings as in claim 2, and mixtures of two or more of the derivatives of formula II, III, IV or V.

4. A froth flotation process according to claim 2 or 3, **characterized in that** A_1 and A_3 is ethyleneoxy and x_1 and x_3 is a number from 1-4.

5. A froth flotation process according to claim 1 or 2, **characterized in that** R^{II} is methyl, hydroxyethyl or hydroxypropyl.

6. A froth flotation process according to any one of claims 1-5, **characterized in that** the derivative is present in an amount of 10-1500 grams per ton of the ore.

7. A froth flotation process according to any one of claims 1-6, **characterized in that** the process is performed in the presence of a polar co-collector of the formula

$R^{III}(A)_pOH$ (VI),

in which R^{III} is a hydrocarbon group with 8-22 carbon atoms, A is an oxyalkylene group having 2-4 carbon atoms and p is a number from 1-6,

or of the formula

$$R^{IV}CO(A)_qY \quad \text{(VII)},$$
O

in which R^{IV} is an aliphatic group having 7-21 carbon atoms, A is an alkyleneoxy group having 2-4 carbon atoms, q is a number from 0-6, and Y is an alkyl group having 1-4 carbon atoms or hydrogen, provided that Y cannot be hydrogen when q is zero.

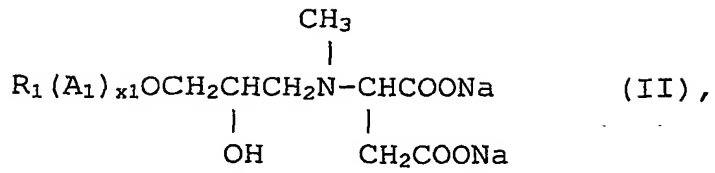
8. A derivative of aspartic acid, **characterized in that** it has the formula

$$R^{II} - N(R^I) - CH(CH_2COOM)COOM \quad \text{(I)},$$

where R^I is a hydrophobic group containing a monovalent hydrocarbon group of 6-24 carbon atoms; R^{II} is an alkyl group with 1-7 carbons atoms or a group of the formula $(B)_yH$, in which B is an alkyleneoxy group with 2-4 carbon atoms and y is a number from 1 to 10 with the proviso that when R^{II} is an alkyl group with 1-7 carbon atoms then R^I is not a group RCO, where R is a C7-C21 alkyl or alkenyl, a group R, where R is a C8-C22 alkyl or alkylene group, or a group $(CH_2)_3OR$, where R is a C8-C22 alkyl or alkylene group; and M is a group selected from the group consisting of a cation or hydrogen.

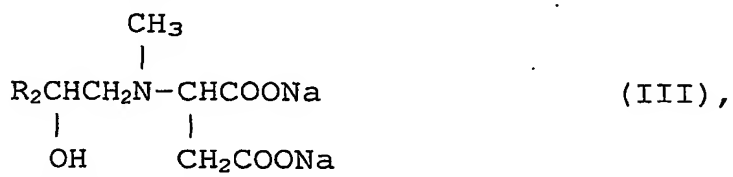
9. A derivative according to claim 8, **characterized in that** R^I is a glycidylether group of the formula $CH_2CH(OH)CH_2O(A_1)_{x1}R_1$, in which R_1 is a hydrocarbon group with 8-24 carbon atoms, A_1 is an alkyleneoxy group with 2-4 carbon atoms and x1 is a number from 0 to 10; a hydroxyl group of the formula $CH_2CH(OH)R_2$, in which R_2 is a hydrocarbon group with 6-22 carbon atoms; a propylene ether group of the formula $C_3H_6O(A_3)_{x3}R_3$, in which R_3 is a hydrocarbon group with 8-24 carbon atoms, A_3 is an alkyleneoxy group with 2-4 carbon atoms and x3 is a number from 0-10; or a group of the formula R_4, where R_4 is a hydrocarbon group containing 8-24 carbon atoms.

10. A derivative according to claim 9, **characterized in that** it is selected from the group consisting of



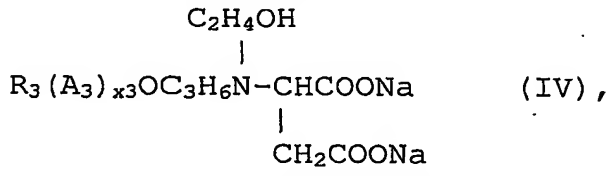
(II),

where R_1, A_1 x1 have the same meanings as in claim 2,



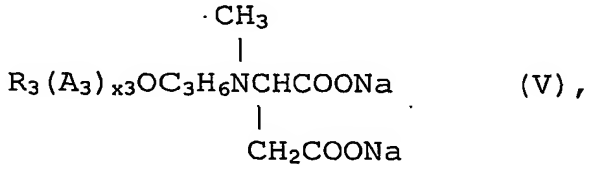
(III),

where R_2 has the same meaning as in claim 9,



(IV),

where R_3, A_3 and x3 have the same meanings as in claim 9, and

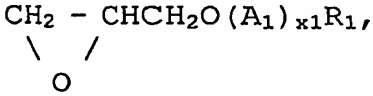


(V),

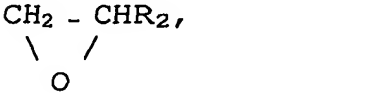
where R_3, A_3 and x3 have the same meanings as in claim 9, and mixtures of two or more of the derivatives of formula II, III, IV or V.

11. A method of producing a derivative according to claim 9, **characterized in that** maleic acid or a salt thereof is reacted under alkaline conditions with

a) a primary amine of the formula $R^{II}NH_2$, where R^{II} has the meaning mentioned above, followed by reacting the intermediate obtained with a glycidylether of the formula



where R_1, x1 and A_1 have the meanings mentioned above, an epoxide of the formula

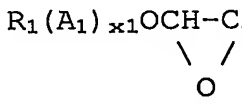


where R_2 has the meaning mentioned above, or a halide compound of the formula $HalR_4$, where Hal is a halide and R_4 has the meaning above; or

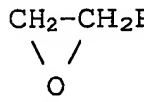
b) with a primary amine of the formula R^INH_2, where R^I has the meaning mentioned above, followed by reacting the intermediate obtained with a halide compound of the formula $HalR^{II}$, where Hal is a halide and R^{II} has the meaning mentioned above.

12. A method according to claim 11, **characterized in that**

i) the disodium salt of maleic acid is reacted with N-methylamine and the obtained (N-methyl)aspartate disodium salt is further reacted with a compound of the formula



where R_1, A_1 and x_1 have the same meanings as in claim 11 to an aspartate of the formula II, or with a compound of the formula

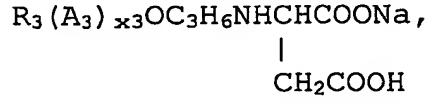


where R_2 has the same meaning as in claim 2, to obtain an aspartate of the formula III, or

ii) the monosodium salt of maleic acid is reacted with an ether amine of the formula

$R_3(A_3)_{x3}OC_3H_6NH_2$,

where R_3, A_3 and x_3 have the meanings mentioned in claim 11 to obtain an intermediate of the formula



which intermediate is further reacted with $Cl(CH_2CH_2O)H$ or CH_3Cl and with NaOH to obtain a derivative of formula IV and V, respectively.